

NERL Research Abstract

EPA's National Exposure Research Laboratory
GPRA Goal 8 - Sound Science
APM # 599

Significant Research Findings

Draft Protocol/Prototype for Estimating Loadings of Sediments to Surface Waters by the Office of Water, Regions, and States

Purpose

A primary environmental focus for the Office of Water is source characterization of sediments and the resulting loadings from watersheds, and the role of sediments in impairing water quality and aquatic habitat. The goal of this research is to design a simplified modeling approach for characterizing and prioritizing sources of sediment loadings from watersheds in the United States. The modeling approach will enable States to better assess the inclusion of various watersheds as impaired, as required under Section 303(d) of the Clean Water Act.

Research Approach

The modeling approach will develop the ability to determine whether local water quality problems due to excessive sediment loading potentially exist in a watershed (basin), and demonstrate the application of the recommended approach/models for predicting changes in sediment budgets in response to changes in proposed watershed Best Management Practices (BMPs), including precision farming, agricultural land management, and other traditional agricultural BMPs.

A simplified approach is developed to evaluate sediment loadings from watersheds and selected land segments within the United States. The proposed model(s) consist of sediment loadings from the Revised Universal Soil Loss Equation (RUSLE). The model is being developed in a spreadsheet format that can be run on most laptop computers or from any website. Simplified inputs are required. The program provides the input sediment loadings to the stream reach.

The proposed spreadsheet model is designed to enable personnel involved in evaluating the impacts of such things as human activities, agricultural practices, and land use changes on achieving a Total Maximum Daily Load (TMDL) for a stream in which the impairment was caused by sediment.

Major Findings and Significance	<p>This model will serve as a demonstration of how models can be used to address TMDL development and evaluating alternative management strategies for sediment delivery issues for watersheds and stream segments.</p> <p>This spreadsheet model is written in Visual Basic and designed to run on PC platforms using Windows(95, 98, 2000, NT) operating environments. The model contains a watershed database consisting of HUC 8 scale watersheds in the U.S. which is subdivided by state boundaries. The watersheds are displayed on a map and point and click by mouse control is used to access smaller scales (state boundaries, etc.). A comprehensive soils data base containing over 23,000 soils series for the U.S. and a major land resource area databases for delineating major stream segments in the watersheds is also part of this modeling package. A comprehensive on-line user help tool for estimating the model input parameters was developed for this tool. The help tool will provide guidance and on estimating the appropriate model parameter for estimating sediment delivery.</p> <p>This tool is designed for screening assessments of sediment transport to streams. Local knowledge of land segment areas will be required of the user in order to run this system.</p>
Research Collaboration and Publications	<p>The simulation strategy was developed by a research team at the Ecosystems Research Division, including Robert F. Carousel, and support from the Office of Water contract 68-C6-0009.</p>
Future Research	<p>Peer review of the model is ongoing.</p> <p>Inquiries concerning this research may be directed to: Robert F. Carousel U.S. Environmental Protection Agency National Exposure Research Laboratory Athens, GA 30605 Phone: (706)355-8065 E-mail: carousel.robert@epamail.epa.gov</p>